MASS. Y3.MP1: A279/2

ALTERNATIVE FUELS SURVEY

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ABOUT THIS REPORT

Alternative Fuels Survey was prepared by the staff of the Metropolitan Area Planning Coucnil. The Metropolitan Area Planning Council is the officially designated regional planning agency for 101 cities and towns in the Boston metropolitan area. The Council assists its member communities in land use planning, environmental quality, housing and economic development.

The preparation of this report was financially assisted by the cities and towns of the MAPC region and a grant from the U.S. Economic Development Administration.

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August, 1980

Report Number: 7

Alternative Fuel Survey

INTRODUCTION

This report presents the results of an alternative fuels survey conducted jointly by the Metropolitan Area Planning Council (MAPC), the Associated Industries of Massachusetts (AIM), and the Massachusetts Technology Development Corporation.

Twenty-three major installations in metropolitan Boston were surveyed by MAPC for information on their boilers. Associated Industries surveyed installations within Massachusetts but outside greater Boston. Industries were asked to provide information on present fuel consumption and indicate their preference for alternate fuels.

AIM is involved as a representative of the industries. AIM is a major lobbyist for industrial interests in Massachusetts and functions as an information clearinghouse and group spokesman.

The Massachusetts Technology Development Corporation is a quasi-public entity established by the Massachusetts Legislature to promote new business developments, particularly among small businesses. It has been a strong proponent of coal-oil mixtures (COM) as an alternate fuel that would help to secure energy supplies and encourage the development of COM related inventions and businesses.

MAPC is a regional planning agency serving local governments on regional issues including solid waste disposal. MAPC is interested in developing solutions to the municipal solid waste problem and in encouraging municipal and industrial cooperation.

An ad hoc task force, responsible for carrying out the survey, was composed of Alec Cameron, Chairman of AIM's Energy Committee, Laura Underwood, Energy Consultant to AIM, Irving Sacks, President of MTDC, and Rich Hersey, Energy Planner of MAPC. The 1978 Powerplant and Industrial Fuel Use Act (FUA) prohibits major fuel installations* from continuing to burn oil or natural gas as their primary fuel unless all "alternative fuels" are impractical. Alternative fuels include: most commonly coal, coal-oil mixtures, solar energy, wood, radiation, hydropower and solid waste. To determine which alternative fuels are most feasible for conversion, industries must consider the environmental impacts, availability, construction and operating costs, and level of technological refinement. Also to be considered are government regulations and whether industries have large enough sites to stockpile fuel. Again, industries can avoid conversion from oil only by demonstrating that all available alternatives are impractical. Subsequent FUA regulations leave industries and other major installations (medical centers, universities, military bases, etc.) with three practical alternatives for complying with the law.

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*A stationary unit consisting of a boiler, gas turbine unit, combined cycle unit, or internal combustion engine which:

(a) has a design capability of consuming any fuel (or mixture thereof) at a fuel heat input of 100 million Btu/hr or greater; or

(b) is in combination of two or more units which are located at the same site, and which in the aggregate have a design capability of consuming any fuel (or mixture thereof) at a fuel input rate of 250 million Btu's/hr or greater

NOTE: The stress is on design, not actual use.

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Industries could disaggregate their production units so that each boiler unit would fall below the defined threshold of major burning installations (m.f.b.i.'s). If they chose this approach, it is possible that established New England firms would take the opportunity to relocate the smaller production units to the Sunbelt or elsewhere.

A second option would be for marginal industries to close down operations entirely. Again, this response could damage the local and regional economy.

The final option would be the conversion of industrial plants to alternate fuels. To encourage this third option, the Economic Regulatory Authority (ERA) requires industries to submit analyses showing the potential for conversion to several alternate fuels. Only after such investigations would ERA issue a Fuels Decision Report to allow continued burning of petroleum or natural gas on an interim or long-term basis.

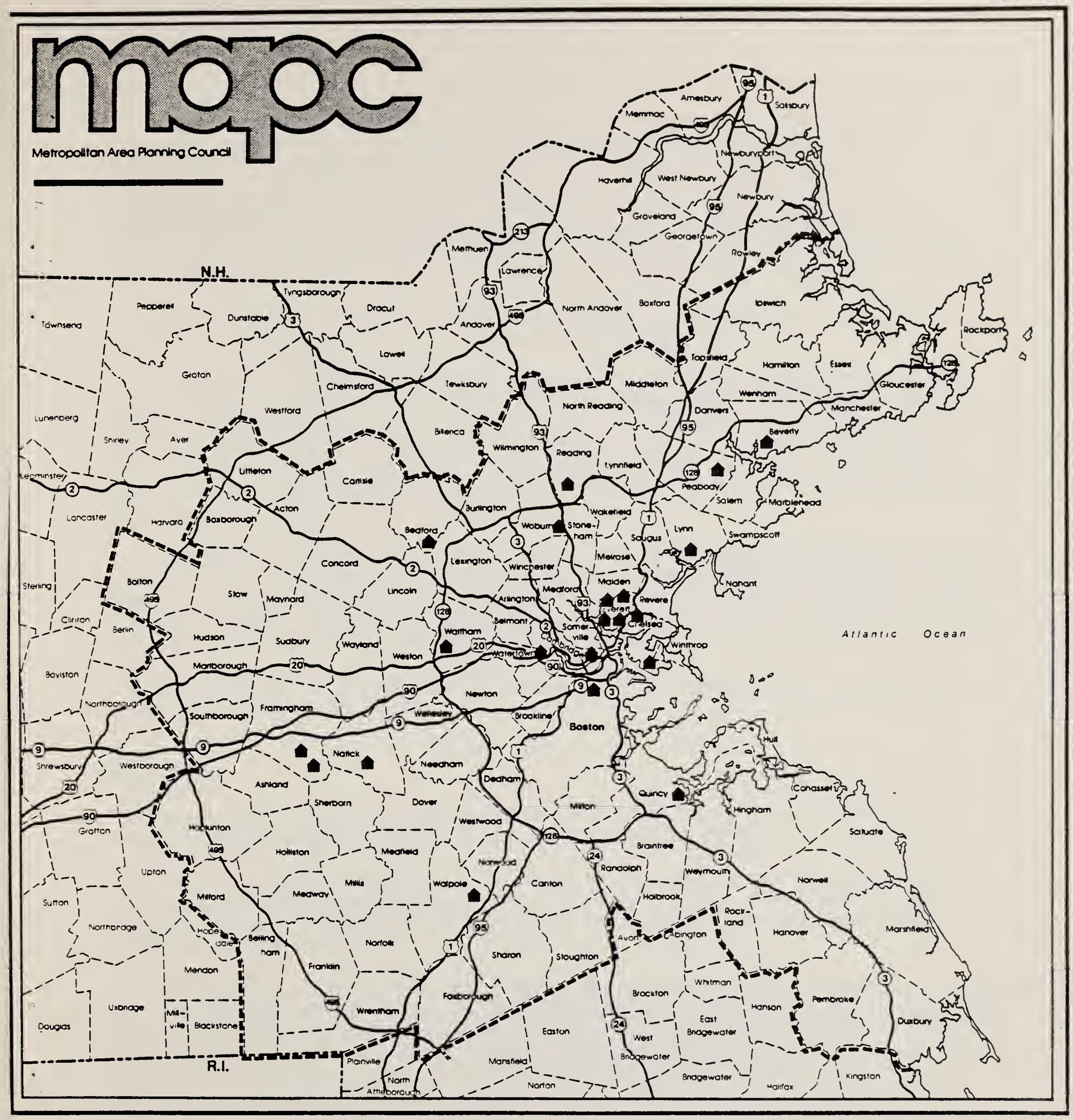
Industrial Survey

MAPC surveyed 23 mfbi's of greater Boston to determine the actual interest in alternate fuels. Map A indicates the locations of the facilities surveyed and a sample survey form is included in Appendix A. The following table summarizes the first and second preferences for alternate fuels as reported by the 16 mfbi's responding to the survey.

TABLE I

Alternate Fuel	First Preference	Second Preference
Coal-oil mix	3 mfbi's	3 mfbi's
Coal	3	1
Solid Waste	2	2
Wood	1	1
Gas/LNG	2	
Hydro-oil	1	
None	4	

Four industries indicated no interest in alternate fuels. However, eleven major installations expressed interest in a wide spectrum of alternate fuels. Among these alternate fuels, coal-oil mixtures (COM), coal, and municipal solid waste (MSW) were the first preference of seven mfbi's, indicating strong development potentials. Further technical studies will determine whether the mfbi's can actually utilize these alternate fuels. Because of the early interest in solid waste, both G.E. Riverworks and USM Corporation have already shown that solid waste is an acceptable and feasible fuel.



MAJOR FUEL BURNING INSTALLATIONS

4 2 0 4 8 12

Scale in Miles

NORTH

Source: Massachusetts Dept. of Public Works

Drawn: September, 1978.

Table II provides information from the survey indicating the mfbi's and their fuel consumption. If these nine mfbi's converted to these alternate fuels, 32 million gallons of petroleum could be conserved annually. 19.3 million gallons could be replaced by trash; 7.1 million gallons could be replaced by coal; and 6.1 million gallons could be replaced by coal-oil mix. Taken together, coal and coal-oil mix would conserve 13,500,000 gallons of oil and trash would replace 19,300,000 gallons. At eighty cents per gallon of fuel oil, trash could save $4.8 million dollars more than coal and coal-oil mix.

Solid waste may save $15.4 million now spent on imported oil. Coal and coal-oil mix may save $10.8 million now spent on imported oil.

In contrast to the fossil fuels (coal and petroleum) solid waste is notably low in sulfur, a major cause of air pollution. When fuels containing sulfur are burned, the sulfur joins with oxygen in the air to produce sulfur oxides, including sulfur dioxide. Sulfur dioxide, an invisible gas, combines readily with water vapor to become sulfurous acid, a mild bleaching agent. Sulfurous acid combines with oxygen in the atmosphere to form sulfuric acid, a corrosive, irritating mist that can injure leaves, cars, statues, and lung tissue.

Additional research needs to be done on the particulate emissions of resource recovery plants. However, initial indications are that standard engineering practices (e.g. electrostatic precipitators, baghouses) can keep emissions within allowable limits. Removal of metals before incineration would eliminate potentially hazardous emissions from tin, lead, zinc, and arsenic.

Substitution of solid waste for petroleum will reduce pollution in the air, on the land, and in the water.

Conclusion

In the search for alternative fuels to oil and gas, there is substantial interest among the major installations in metropolitan Boston.

For New England industries solid waste has at least one major advantage over coal and other alternative fuel; trash is in strong supply right here in New England. As an indigenous energy resource, solid waste would not have to be transported long distances.

Some energy trash plants--solid waste and resource recovery facilities-- are now being planned or considered in the metropolitan area. Resource recovery facilities burn trash inside special boilers which produces steam used to produce electricity. In addition to producing energy, resource recovery facilities are seen as a way to help solve critical trash disposal problems in greater Boston. By burning trash, its remaining volume and weight is drastically reduced and converted into a more environmentally acceptable state: ash. By reducing the volume and weight of trash, cities and towns are left with less to dispose of in landfill sites. In Massachusetts, state approved landfill sites are in short supply. Health problems with landfills have forced environmental agencies to close 23 sites in Greater Boston. In planning resource recovery facilities, accommodations must be made for either consuming the summer surplus waste or landfilling it.

TABLE II

Industrial Potential to Reduce Petroleum Consumption by Increased Use of Coal and Solid Waste

Alternate Fuel Option[1]	Major Fuel Burning Installation	Present Btu's/year	Offset Gallons/yr.	Equivalent Oil Cost[2]
COM[3] (MSW)	Brandeis University Waltham	$310X10^9$	$2.21X10^6$	$\$1.8X10^6$
COM (Coal)	Eastman Gelatine Corp Peabody	$1,390X10^9$	$9.92X10^6$	$\$7.9X10^6$
COM	Soldier's Home Chelsea	$146X10^9$	$1.04X10^6$	$\$0.83X10^6$
Coal (Wood)	AMMRC Watertown	$105X10^9$	$0.75X10^6$	$\$0.6X10^6$
Coal (COM)	Hanscom AFB Bedford	$187X10^6$	$1.34X10^3$	$\$1.07X10^3$
Coal (MSW)	MIT Cambridge	$980X10^9$	$7X10^6$	$\$5.6X10^6$
MSW (COM)	G.E. Riverworks Lynn	$2,159X10^9$	$15.42X10^6$	$\$12.3X10^6$
MSW[4] (Wood)	USM Corp Beverly	$540X10^9$	$3.86X10^6$	$\$3.09X10^6$
Sub-total COM[5]		$0.9X10^{12}$	$6.4X10^6$	$\$5.1X10^6$
Sub-total Coal		$1.0X10^{12}$	$7.1X10^6$	$\$5.7X10^6$
Sub-total MSW		$2.7X10^{12}$	$19.3X10^6$	$\$15.4X10^6$
TOTAL		$4.5X10^{12}$ Btu	$32.X10^6$ Gal	$\$26X10^6$ ($26,000,000)

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1. First and (second) preference shown. Calculations are based on first preference only.
2. Cost estimated at $0.80 per gallon
3. Coal-Oil Mixture
4. Municipal Solid Waste
5. COM sub-total reflects a 0.5 multiplier. At least 59% of the mixture is oil.

The disposal of solid waste is a primary health concern of municipalities. Present landfill practices are being supplemented by baling and compaction to reduce the volume of waste. Recycling efforts can reduce the mass of waste. However, resource recovery holds great potential for alleviating pollution while reducing landfill requirements. Furthermore, increasing energy costs and stricter landfill regulations have made resource recovery an economic and practical alternative.

APPENDIX A

AIM & MAPC & MTDC/ FUA (9/79)

DATE: ____________

Survey of Fuel Users Whose Boilers Exceed 100MBtu/hr Rated Capacity

BY: ____________

QUESTIONNAIRE

1. Name of plant and location (street and town) ____________

____

2. Mailing Address ____________

Phone # ____________

3. Owner ____________

Address ____________

4. Name of Chief Plant Engineer ____________

Phone # ____________

5. Name of Operations Official responsible for plant ____________

Phone # ____________

6. Boilers:

	Design Type	Rated Capacity	Fuel Input X MBtu/hr.	Primary Fuel	Back-up Fuel	Fuel Consumption By Type	Btu's/yr	Fuel Cost By Type	Use (Process Steam, Co-gen, etc.)
#1									
#2									
#3									
#4									

7. Brief description of present pollution abatement equipment on stack ______________________________

____

____

____

8. Have any boilers described in #6 above ever burned coal? If so, which ones?

____

9a. Of item #6, which are capable, with minor changes, of burning coal? What specific changes are necessary?

____

____

9b. Of item #6, which are capable, with major changes, of burning coal? What specific changes are necessary?

____

____

10 Have you retained any coal handling equipment on your site or does your site have space to install coal handling equipment? ______________________________

____

____

11. Rank the following alternate fuels in order of your interest in adopting them to your facility.

Municipal waste ______________

Coal-oil mixture ______________

Wood ______________

Other ______________

No interest in any alternative to present system ______________

12. Are you sufficiently informed about these alternate fuels? ____________________

13. Are you interested in further information on an alternate fuel? ____________________

Which one(s)? ____________________

What information? ____________________

____

14. Are plant officials aware of the federal Powerplant and Industrial Fuel Use Act of 1978 (FUA) and Department of Energy regulations? ____________________

15. Are there any plans to comply with the Fuel Use Act directives from the Department of Energy? __________

If so, what (briefly)? ____________________

____

16. Associated Industries of Massachusetts is hosting a meeting to discuss options related to the Fuel Use Act. The meeting will be at the Marriott Hotel, Newton on October 15, 1979. Would you attend? __________

Return questionniare to:

Rich Hersey
Metropolitan Area Planning Council
44 School Street
Boston, MA 02108

or call: (617) 523-2454